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# COLEOPTERA ASSOCIATED WITH IRONWEED, VERNONIA INTERIOR SMALL IN KANSAS*

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A knowledge of the species, life histories and habits of the insects of the prairie or any grassland habitat is difficult to obtain because of the large number of different plants involved. Before such knowledge can be realized it is first necessary to reduce the grassland complex into its various plant elements and determine the insects associated with each plant species.

For several decades **Vernonia interior** Small has been one of the more important pasture weeds in Eastern Kansas, ranking along with sumac, vervain, buckbrush, and ragweed. A survey of the insects associated with ironweed and a study of their biology and habits was begun June, 1939, and continued through June, 1941. The following discussion concerns the 47 species of Coleoptera which were either feeding on some portion of the plant or utilizing its heavy foliage for shelter.

**Vernonia interior** Small, a member of the composite family, is a coarse, erect perennial with alternate leaves. Its purple to rose blossoms may be seen in the prairies, pastures, and wastelands of Kansas from July to September. According to Gates (1940) **V. interior** has been reported from all counties in Kansas except 24 in the western and southwestern parts of the state.

Concerning the propagation and growth of ironweed Aldous (1935) says "ironweed is first established by seed and then spreads rapidly by thrifty root stalks to form a clump frequently containing 100 stems. The roots of ironweed do not penetrate the soil more than three or four feet, even in fertile soil most of the roots are concentrated in the surface foot. This weed is able to grow under extremely dry conditions. It starts growth early in the spring ahead of most of the native forage plants."

The height of the plant varies from three to six feet, depending on its enviroment. It usually averages three or four feet in most of the upland pastures.

Sources of ironweed for this study included several pastures north of Manhattan, and a sandy upland pasture in western Pottawatomie County, known as the Little Gobi Desert. Collections

*Contribution No. 506 from the Department of Entomology.

[1]This investigation was conducted in part in connection with Project 211, Bankhead-Jones, of the Kansas Agricultural Experiment Station.

and field observations were made about twice each week during the growing seasons of the two year period of investigation.

Stems were opened in the laboratory and examined to determine the species, stage of development, and abundance of the borers present. In April and May larvae and pupae of the Coleopterous stem borers were collected from the previous year's stems, placed in vials, and kept in a dark place until emergence of adults and their parasites. The shoe box method (Wilbur and Fritz, 1939) was used to rear the mordellid borers and their parasites.

## Order Coleoptera

At least 13 species of Coleoptera including three Cerambycidae, one Mordellidae, four Curculionidae, one Elateridae, two Scarabaeidae and two Meloidae were observed feeding on ironweed. Thirty-four additional species of Coleoptera comprising 13 families have been collected from ironweed but their relationship to this plant was not determined.

Family CERAMBYCIDAE* Two members of this family, **Ataxia hubbardi** Fisher and **Hemierana marginata** ab. **ardens** (Lec.), burrowed in the stems. Another species, **Hippopsis lemniscata** (F.), was found in a burrow made in an ironweed stem but was taken only once. Kelly (1931) reported that **A. hubbardi** and **H. lemniscata** fed in stems of cocklebur (Xanthium spp.). *Identified by W. S. Fisher.

**Ataxia hubbardi** Fisher. The larva was whitish with dark brown mandibles. When full grown it averaged about 2 to 3 mm. in diameter and 18 mm. in length. Occasional individuals were 24 mm. long. Mature larvae of **A. hubbardi** could be distinguished from the larvae **H. marginata** by the presence of a fleshy spine on the tip of the abdomen of the former (Fig. 4 and 5). The younger borers did not exhibit their character. The pupa was bare and slightly shorter and thicker than the mature larva. The adult was reddish-brown with some lighter markings on the elytra and varied from 10-14 mm. in length (Fig. 1 left).

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EXPLANATION OF FIGURES IN PLATE I

Fig. 1. Adults of **Ataxia hubbardi** (left) and **Hemierana marginata** ab. **ardens** (right).

Fig. 2. Longitudinal section of ironweed stem showing larvae of **Hemierana marginata** in its burrow which was plugged above and below larva to form an overwintering chamber. (Puparium shown just above the larva is that of a dipterous stem borer, **Agromyza** sp.)

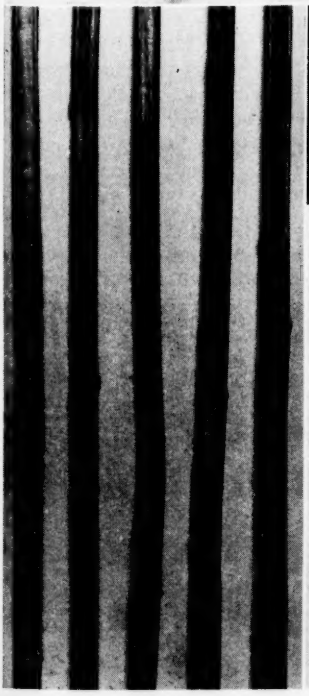
Fig. 3. Longitudinal sections of ironweed stems showing burrows of **Mordellistena pustulata**. Stem at left was not infested.

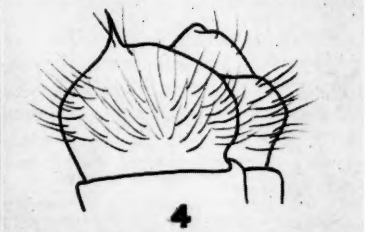
Fig. 4. Side view of tip of abdomen of **Ataxia hubbardi** larva.

Fig. 5. Side view of tip of abdomen of **Hemierana marginata** larva.

1

2





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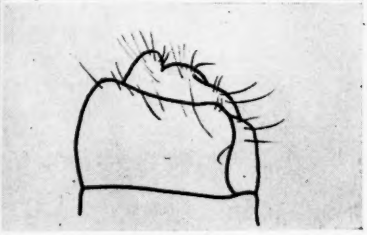

Although no eggs were found, oviposition probably occurred during June since larvae were found in the stems as early as the second week in July.

In July the larvae hatched and began feeding in the pith about halfway up the stem. They burrowed downward through the pith to the crown making an irregular spiral path. The larvae fed until the last of September and overwintered in the stem near the crown as full grown individuals. Larvae in the smaller stems left only the hard outer tissues when their feeding activities had ended. Since the borers fed only in the pith during most of the growing season, it is thought that little injury resulted from their feeding activities. The burrow was plugged with frass above and below the borers to form their overwintering cell. Pupation occurred during the last of April and the first of May. The average length of the pupal stage in the laboratory was 15 days.

Fifty-one **A. hubbardi** and **H. marginata** larvae were found in 128 stems selected at random from several pastures during the growing season. This sample indicated that about 40 per cent of the plants were hosts to the cerambycid borers. There was only one borer in each infested stem.

Of the 33 larvae and pupae which were reared successfully, all except four were **A. hubbardi.** These were the only data indicating the relative abundance of the two species.

**Hemierana marginata** ab. **ardens** (Lec.). When full grown the larvae averaged 15 mm. in length and 1.75 mm. in diameter. The abdomen was white and the head and thorax yellow. The bare pupa was slightly smaller than the larva. The adult was black with orange markings on the head, thorax, and antennae (Fig. 1).

The life history and feeding habits were similar to those of **A. hubbardi.** The full grown larvae overwintered near the crown of the plant sealed in individual cells (Fig. 2). Pupation occurred in April and May and the adult emerged in about 10 to 14 days. Adults were collected on the plant in June and the larvae of the following generation were found inside ironweed stems about the middle of July.

Several specimens of **Monogonogastra agrili** (Ashm.) (Braconidae) were collected or reared from pupae of **A. hubbardi** and **H. marginata** in May. One specimen of **Iphiaulax** sp. (Braconidae), identified from the cocoon, was also a primary parasite of the stem borers. From this specimen there emerged six hyperparasites, **Merisus** n. sp. (Pteromalidae) on May 26. Only six parasitized cerambycids were found in the field and in each instance a silky cylindrical cocoon about one inch long was formed about the host.

**Hippopsis lemniscata** (F.) The one larva of **H. lemniscata** collected in November from a **V. interior** stem was 13 mm. long and 1.5 mm. in diameter. The head and prothorax were pale yellow and the rest of the body whitish. Brown hairs were present on the underside and on the last abdominal segment. The burrow of this larva was similar to those of the other two cerambycids.

Concerning this species, Blatchley (1910) gave the following description and note:

Elongate, very slender, cylindrical, dark reddish-brown; thorax with two white lines on each side; elytra each with three whitish lines, antennae more than twice the body length. . . length 10-13 mm. May 28-June 7. Breeds in stems of ragweed (**Ambrosia**); also in tickweed and burmarigold (**Coreopsis and Bidens.**).

Family MORDELLIDAE.* Four species of this family were collected from ironweed, **Mordella insulata** Lec., **Mordellistena sericans** Fall, **Mordellistena pustulata** Melsh., and **Mordellistena** sp. Adults of **M. pustulata**, the only species reared and observed feeding, were collected in large numbers. *Identified by H. S. Barber.

**Mordellistena pustulata.** The larvae was 7-9 mm. long when full grown and about 1.0 mm. in diameter. The body varied from white to cream in color with a yellowish head capsule and dark brown mandibles. The bare white to yellow pupa was about the same size as the larva. The adult was 2-3 mm. in length, black, with elytra spotted with silvery pubescence.

Although the larvae were numerous they probably did not cause serious injury to the plant. Their crooked, winding burrows were usually found in the upper two-thirds of the stem and varied in length from 5 to 29 inches with an average of 18 inches. (Fig. 3). The maximum burrow width was 2 mm. with the major portion of the burrow about one-half that size. For most of its length the burrow was filled with light colored frass. Larval activity began in the upper part of the stem and in no instance did the burrow extend below the crown.

The larva overwintered in its burrow in the pith usually in the lower half of the stem. It pupated in the spring within the stem, and the adult emerged in May. There was only one generation each year. No eggs were found but they were probably inserted in the stem during June, since the adults were most abundant about that time. By tracing the burrows of the young larvae it was determined that the eggs were laid just below the junction of the petiole with the stem. As a result of oviposition a tiny brown scar was left on the stem. It was evident that a few eggs were laid in the petioles and midribs since burrows could be traced to those structures. The

earliest date that larvae were taken from the stems was the first week in July.

Of the 103 stems examined near the end of the growing season, 99 were hosts to at least one borer. Usually there were more than one borer per stem and the maximum was seven. Two hundred and ten larvae were taken from the 103 stems which indicated the average population was about two per stem.

Forty individuals of the genus **Schizoprymnus** (Braconidae) were reared from **M. pustulata** pupae. According to C. F. W. Muesebeck, who made the determinations of these specimens, they were apparently undescribed. The only indication of the percentage of parasitism was the fact that four times as many parasites were reared as were beetles. The emergence of the parasites was simultaneous with the emergence of the hosts.

Family CURCULIONIDAE.* Adults of **Rhodebaenus tredecimpunctatus,** Ill. and **Pantomorus pallidus** Horn were found associated with ironweed. Blatchley and Leng (1916) reported having taken these species along with **Anametis setosus** B. & L. and **Aulobaris scolopax** Say on ironweed in Indiana. Nine other species of Rhynchophora were collected from **V. interior** but their relationship to the plant was not learned. *Identified by L. L. Buchanan.

**Rhodebaenus tredecimpunctatus.** Four adults of this insect generally known as the cocklebur billbug were taken from ironweed near Manhattan during the spring. No other stages were found associated with the plant but the feeding punctures made by the adults were observed. Kelly (1931) reported the insect on cocklebur, (Xanthium spp.). Blatchley and Leng (1916) described the adults and reported that they were common throughout Indiana from April 17 to October 6 when they could be taken in the axils of the leaves of ironweed in the stems of which they are said to breed. They stated that these beetles not only breed in cocklebur and other species of **Xanthium** but also in many other Compositae such as joe-pye weed, leaf cup, sunflower, thistle, greater ragweed and rosin weed.

**Pantomorus pallidus** Horn. Adults of this species were observed feeding on the terminal growth of ironweed in June. No other stage of this insect was found associated with the plant. Blatchley and Leng (1916) reported that **P. tesselatus** Say var. **pallidus** was swept from ironweed and gave a description of the adult.

Family **MELOIDAE.** Two species of blister beetles, **Macrobasis immaculata** (Say) and **Epicauta cinerea** (Forst)., were observed feeding on **V. interior** July 18, 1940. Twenty-three individuals had almost completely defoliated the plant on which they fed. On other occasions throughout the growing season blister beetles were observed

and collected from ironweed leaves but usually only one or two specimens at a time.

Family **ELATERIDAE.** One wireworm, **Melanotus** sp. was observed feeding on the roots of ironweed in April and an adult of the same genus was collected from a plant in August.

Family **SCARABAEIDAE.** White grubs were found feeding on roots of ironweed on several occasions. They were a species of **Phyllophaga,** and probably the wheat white grub, **P. lanceolata** (Say). Adults of this species were taken while feeding on ironweed leaves in June. According to Hayes (1919) ironweed is apparently an important food plant of the wheat white grub in the pastures. He also reported in the same paper that there was evidence that the females preferred to lay their eggs at the base of the ironweed plant. In one case 81 eggs were found within a radius of two inches from an ironweed plant and in the first eight inches of soil. Hayes (1920) reported ironweed as a food plant of **Phyllophaga crassissima** (Blanch). McCulloch (1923) collected adults of **P. crassissima, P. rubiginosa** Lec., **P. bipartita** Horn, and **P. hirticula** var. **comosa** from ironweed and reared **P. crassissima** from a grub collected from ironweed roots.

Other Coleoptera collected from ironweed are:

| | | |
|---|---|---|
| Histeridae | | |
| **Phelister subrotundus** Say | 1 specimen | May |
| Cantharidae | | |
| **Cantharis** sp. | 1 | May |
| Melyridae | | |
| **Collops quadrimaculatus** (F.) | 1 | May |
| Cleridae | | |
| **Hydnocera pubescens** Lec. | 30 | July-Aug. |
| Mordellidae | | |
| **Mordella insulata** Lec. | 5 | June |
| **Mordellistena sericans** Fall | 8 | May-June |
| **Mordellistena** sp. | 2 | June |
| Meloidae | | |
| **Zonites bilineata** Say | 1 | Aug. |
| Buprestidae | | |
| **Acmaeodera pulchella** (Host.) | 14 | July-Aug. |
| Dermestidae | | |
| **Attagenus** sp. | 1 | June |
| Cerambycidae | | |
| **Tetraopes tetraophthalmus** (Forst) | 4 | June |
| **Mecas inornata** (Say) | 1 | June |
| Chrysomelidae | | |
| **Aphthona texana** Cr. | 1 | July |
| **Cryptocephalue quadrimaculatus** Say | 2 | June |
| **Diabrotica longicornis** (Say) | 6 | Aug. |
| **Diabrotica 12-punctata** (Fab.) | 7 | Aug. |
| **Glyptina** sp. prob. **spuria** Lec. | 1 | July |
| **Metriona** sp. prob. **atripes** (Lec.) | 1 | Aug. |

| | | |
|---|---|---|
| **Oedionchis sp. prob. miniata (F.)** | 1 | May |
| **Pachybrachis sp.** | 15 | May-Aug. |
| **Zygograma saturalis (F.)** | 6 | July |
| Anthribidae | | |
| **Brachytarsoides sp.** | 1 | Aug. |
| Curculionidae | | |
| **Apion oblitum** Smith | 1 | June |
| **Baris sp.** | 1 | July |
| **Centrinaspis sp.** | 1 | Aug. |
| **Conotrachelus leucophaeatus** Fahr. | 1 | Aug. |
| **Epicaerus imbricatus** | 4 | May-July |
| **Pseudobaris farcta** Lec. | 21 | July-Aug. |
| **Smicronyx fulvus** Lec. | 8 | Aug. |
| **Smicronyx sp.** | 6 | Aug. |

## SUMMARY

1. At least 47 species comprising 14 families of Coleoptera are associated with ironweed, **Vernonia interior** Small, directly by feeding on the plant or indirectly as visitors.

2. At least thirteen of these species fed on some portion of the plant. Aproximately 40 per cent of the stems of ironweed examined were infested by one of the three Cerambycidae, **Ataxia hubbardi, Hemierana marginata** ab. **ardens,** and **Hippopsis lemniscata.** One Mordellidae, **Mordellistena pustulata,** was found in 96 per cent of the stems examined. Two Meloidae, **Macrobasis immaculata** and **Epicauta cinerea** fed on the leaves. Four Curculionidae, **Rhodebaenus 13-punctatus, Pantomorus pallidus, Aulobaris scolopax,** and **Anametis setosus** fed on the stems and terminal growth. Two Scarabaeidae, **Phyllophaga lanceolata,** and **P. crassissima** fed on the roots as did one Elateridae **Melanotus sp.**

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# NOTES ON NORTH AMERICAN RHINOPSYLLA WITH DESCRIPTION OF A NEW SPECIES (PSYLLIDAE: HOMOPTERA).

L. D. TUTHILL, Iowa State College, Ames, Iowa

The genus **Rhinopsylla** is poorly represented in most collections of Psyllidae. Due principally to this paucity of material, numerous errors have been made by all those who have worked with the group. As the author makes no claim of infallibility some of the conclusions recorded in this paper may later prove to be erroneous. Some previously made errors are corrected however.

## Rhinopsylla schwarzii Riley

1885 **Rhinopsylla schwarzii** Riley, Proc. Biol. Soc. Wash. II:78.
1911 **Rhinopsylla schwarzii** Crawford, Pom. Coll. Jour. Ent. III:441.
1914 **Rhinopsylla schwarzii** Crawford, U.S.N.M. Bull. 85:59.
1938 **Rhinopsylla schwarzii** Brimley, Ins. N. C. 103.

Length to tip of folded wings 3-3.5 mm.

**Color:** General body color red to brown. Abdomen green, darker dorsally. Tibia and tarsi white. Segments I and II of antennae red, III, IV, and V white, remainder dark. Wings glistening, hyaline.

**Structure:** Head very deeply cleft anteriorly, narrower than thorax. Vertex very narrow basally, with deep oblique sulcus on each side from near base toward antero-lateral margin between antenna and eye. Eyes protruding, anterior; posterior margin even with lateral ocelli. Genae slightly produced beneath antennae. Antennae large, almost three times as long as width of head, segments III and IV thickened, remainder slender. Thorax moderately arched. Pronotum narrow, above plane of vertex. Prothoracic episterna strongly produced anteriorly, in dorsal view appearing collar like. Forewings small, slender, acutely pointed, about three times as long as wide; costal margin strongly curved; Rs short, slightly arched to costal margin; cubital cell larger than medial; radular areas prominent. Hind wing slender, exceeding abdomen. Legs long. Forefemora greatly enlarged in both sexes, sometimes appearing flattened and curved due to collapse. Hind tibia with a minute basal spur, one outer and two inner apical spines. Metacoxa with short, rounded anterior processes.

**Genitalia:** Male genitalia small. Proctiger short, with a large somewhat dorsally projecting caudal lobe. Forceps small; in lateral view broad basally, narrowed to apex, curved forward; in caudal view broad and outcurved basally then narrower to truncate apices, a slender laterally projecting black tooth at apex, a smaller one on

medial side. Terminal portion of oedagus greatly enlarged, a slender medial, caudal process near tip. Female genital segment very short; ventral valve very broad, not at all produced, medially excavate; dorsal valve narrow, overhanging, blunt.

Described from 14 males and females from the Okefenokee Swamp, Georgia, three males and one female from northern Florida and one male from Shallotte, N. C. The Ga. and Fla. specimens were taken while sweeping grass and other low vegetation amongst scattered pines, it was impossible to determine the host plant. The females previously described as belonging to this species are found to represent a different, undescribed species.

Type, male, no. 660 U. S. N. M. Baldwin, Florida, March 11, 1879, E. A. Schwarz. Allotype, female, Fargo, Ga. Aug. 1, 1939, L. D. Tuthill in author's collection.

Type examined.

**Rhinopsylla arcuata** n. sp.

1938 **Rhinopsylla schwarzi** Tuthill, Ent. News XLIX:244.

Length to tip of folded wings 3.25 mm.

**Color:** General color red. Distal portions of tibiae, tarsi, segments III, IV and V of antennae, white. Distal portion of antennae black. Wings hyaline.

**Structure:** Head short, two and one-half times as wide as long. Deeply cleft in front (not as deeply as in **schwarzii**). Vertex somewhat rounded down in front, with a pair of prominent discal foveae. Eyes protruding, lateral. Genae somewhat swollen ventrally. Antennae two and one-half times as long as width of head, segment III strongly thickened. Thorax broad, somewhat arched. Pronotum broader than vertex. Prothoracic episterna produced. Forewings acutely angled, over two and one-half times as long as wide, costal margin strongly curved; Rs very short, arched to costal margin; marginal cells about equal in size. Prothoracic femora long, scarcely swollen. Hind tibia with small basal tubercle, two inner and one outer apical spines.

**Genitalia:** Female genital segment short. Ventral valve about one-half as long as preceding sternite, broad, notched apically. Dorsal valve exceeding ventral, narrow, down-curved, blunt.

Described from two females bearing the data, Ponce de Leon, Florida, July 13, 1934 R. H. Beamer. These specimens were erroneously designated (l. c.) as the female of **R. schwarzii** Riley. This species is quite distinct from **schwarzii**, especially in head characters, the anteriorly produced portions of the head are less pronounced and the eyes are lateral rather than anterior. Also the prothoracic femora are much less enlarged, Rs is shorter and more strongly

arched. One additional female from the Okefenokee Swamp, Georgia, seems to be the same but as it is a poor specimen it is impossible to say with certainty.

**Holotype**, female, in Snow Collection, University of Kansas. Paratype in author's collection.

### Rhinopsylla athenae Crawford

1914 **Rhinopsylla athenae** Crawford, U.S.N.M. Bull. 85:60.

Length to tip of folded wings 3.5 mm.

Crawford described this species as follows:

"Length of body 1.9 mm; length of forewing 3; width of head 0.72. General color deep shining black on head, pronotum, and praescutum; rest of body flavous orange; antennae black, except IV and V and tip of III white; male genitalia a little darker than rest of abdomen.

"Somewhat similar to **schwarzii**, but head not so strongly birostrate, not so deeply cleft, not as broad as thorax; eyes hemispherical and directed somewhat forward (as in **schwarzii** also), but not giving the appearance of being stalked; antennae somewhat similar, but third joint less swollen.

"Thorax scarcely arched; pronotum rather long; praescutum small. Legs very long; forefemora larger than the second pair, but not so conspicuously enlarged as in **schwarzii**; tibiae much longer than femora. Wings narrow, three times as long as broad, narrowly angulate at apex, venation rather similar.

"**Genitalia—Male.**—Anal valve rather small, broad in caudal view, somewhat extended caudad in lateral view; forceps small, cultrate, inner edge rather sharp, only a little arched."

One specimen in the University of Kansas collection (Greenwood Co., Kansas, Aug. 2, 1923 Beamer-Lawson) appears to be this species. I add a few additional notes from it: Vertex rounded down anteriorly and posteriorly. Pronotum narrow, "collar-like." Rs rather long and straight. Hind tibia with small basal spur. Metacoxa with anteriorly projecting processes.

**Type**, male, Athens Georgia, June 15, 1909 (J. C. Bradley). Type in the collecteion of Cornell University (**fide** Crawford).

### Rhinopsylla antennata (Crawford)

1910 **Paratrioza antennata** Crawford, Pom. Coll. Jour. Ent. II:229.
1911 **Rhinopsylla antennata** Crawford, Pom. Coll. Jour. Ent. III:441.
1911 **Rhinopsylla antennata proxima** Crawford, Pom. Coll. Jour. Ent. III:441-442.
1914 **Rhinopsylla antennata** Crawford, U.S.N.M. Bull. 85:61.
1914 **Rhinopsylla antennata proxima** Crawford, U.S.N.M. Bull. 85:62.
1938 **Rhinopsylla dimorpha** Caldwell, Ohio Biol. Surv. Bull. 34:246.

Length to tip of folded wings 3-3.5 mm.

**Color:** Male, general color black, abdominal venter, tibiae, tarsi segments III, IV, and V of antennae, white to yellow. Female, general color red, segments III, IV, and V of antennae white, apices black. Considerable variation, as presence of light areas on vertex or thorax, lighter legs, dark abdomen, etc.

**Structure:** Head stout, slightly over twice as wide as long, cleft anteriorly. Vertex somewhat rounded down anteriorly, a more or less prominent oblique discal sulcus on each side, extending toward base of antenna. Eyes lateral. Genae swollen ventrally. Segments III and IV of antennae thickened. Antennae slightly less than three times as long as width of head. Thorax slightly arched. Pronotum broader than vertex. Prothoracic episterna strongly produced. Forewings angulate, almost three times as long as broad; costal margin arcuate; Rs long (often attaining furcation of media), more or less sinuate; marginal cells about equal. Forefemora enlarged, short. Hind tibia with small basal spur, two inner apical spines. Metacoxa with anteriorly projecting processes.

**Genitalia:** Male proctiger short, with a blunt triangular caudal lobe. Forceps shorter than protiger; in lateral view broad basally, evenly narrowed to apices, strongly curved cephalad; in caudal view slightly arched, tapered from base to truncate apices, apices with stout lateral and medial processes, appearing somewhat T shaped. Female genital segment short; ventral valve as long as preceding sternite, broad, scarcely produced; dorsal valve exceeding ventral, narrow, overhanging, apex dark, blunt.

Described from numerous specimens from the following localities: Colorado, Utah, Oklahoma, Texas, Ohio. The specimens at hand show considerable variation, especially in color and in wing characters, even in the specimens collected together. Two male specimens are at hand from Brownsville, Texas which are quite small and have the color of the typical females but structurally they are indistinguishable from typical males.

Crawford's variety **proxima** is merely the female of this somewhat dimorphic species. His description of the male genitalia was very superficial, but upon closer examination of the types they prove to be identical with male paratypes of **dimorpha** Caldwell. The later name therefore must be sunk in synonymy. Caldwell collected his specimens on **Polygonum persicaria** L.

**Type**, male, Colorado, no. 18082, U. S. N. M.

Type examined.

# DESCRIPTIONS AND RECORDS OF DISTRIBUTION OF PHYLLOPHAGA* (COLEOPTERA: SCARABAEIDAE)

MILTON W. SANDERSON, University of Arkansas

Seven species of Phyllophaga, which occur in the United States, are discussed in this paper. Two of these species, one from Arkansas and other middle west and southeastern states, and the other from Arizona and Mexico, are described as new. A new name is proposed for one species whose present name is preoccupied. Four records of species new to the United States are presented.

The following name is proposed for a locally abundant species of Phyllophaga which has a wide distribution and a wide range of plants upon which the adults are known to feed. Although only two records have been taken for western Arkansas, it is known to occur abundantly in eastern Oklahoma.

**Phyllophaga sylvatica** n. sp.

This species is closely related to **corrosa** Lec. and **luctuosa** Horn, and appears to occupy an intermediate position between the two. The body varies from reddish-brown to nearly black, and is shining and glabrous above except for some extremely minute hairs which arise from punctures on the disc of pronotum and elytra.

Length 16-20 mm.; width 8.5-10.5 mm.

MALE. **Antenna** 10-segmented, club equal to about three-fourths length of stem. Clypeus deeply emarginate, margin slightly reflexed; surface coarsely and closely punctured, punctures slightly more distant than those on front; clypeal suture impressed. **Pronotum** coarsely and unevenly punctured, punctures separated from one-half of several times their own diameters especially near center of disc; lateral margin of pronotum parallel in basal one-half, coarsely crenate from base to apex. **Hind leg**—Fixed spur of hind tibia subequal to width of this tibia at apex, nearly as long as free spur, curved and pointed; slight emargination at base; free spur widest at middle, bluntly rounded at apex, slightly longer than first tarsal segment. Tooth of claw strong and median. **Metasternum** finely, evenly and closely punctured, punctures especially at sides scarcely separated by their own diameters; hairs erect and about equal in length to greatest width of middle femora. **Elytra** widest behind middle, very finely and shallowly punctured in marginal two-thirds; sutural one-third irregularly rugose; sutural costa distinct, the discal scarcely discernible; marginal costa evident.

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**Abdomen** very finely punctured, less closely in median flattened depression; penultimate sternite in median one-fifth suddenly and almost perpendicularly declivous on posterior two-fifths, apex of delivity coarsely granulate; apical sternite slightly depressed, nearly smooth and with a few small granules in depression; pygidium shining, glabrous, evenly convex, finely and irregularly punctured.

FEMALE. Slightly broader than male and resembling it closely in general sculpture. Club of antenna equal to funicle. Abdomen convex and extremely finely punctured; last abdominal sternite with a deep U-shaped depression at middle of disc behind a deep and wide emargination, emargination partially closed by a thin layer of the integument.

Holotype male, allotype female, 3 male and 11 female paratypes, Sequoyah Co., Oklahoma, April 14, 1939, collected by M. W. Sanderson and J. S. Cook on black jack oak and water oak. Numerous additional paratypes from the same locality, April 24, 1940, M. W. Sanderson. Additional designated paratypes as follows: **Arkansas.** Washington Co., April 21, 1939, 1♀, J. S. Cook, at light; Crawford Co., April 21, 1940, 1 ♀, on persimmon, M. W. Sanderson. **Georgia.** Kennesaw Mt. March 31, 1936, 2♂, 1♀, on oak; April 26, 1936, 1♂; May 7, 1936, 1♂, oak; May 10, 1934, 3♂, hackberry; May 14, 1936, 1♂ 1♀, oak; May 17, 1940, 13♂, 25♀, poison oak, red oak, black locust, persimmon, blackberry, chinquapin, bladdernut, hickory, chestnut, oak. May 20, 1936, 2♂, oak; May 25, 1935, 3♂. Thomaston, March 27, 1938, 5♂, at light. Head River, June 8, 1937, 1♂. Covington, May 16, 1940, 1♂, red oak. Prattsburg, April 15, 1940, 3♂, 5♀, water oak, red oak, wild plum, at light; April 23, 1938, 2♀, red oak, and 1♂, 1♀, oak; April 27, 1938, 7♂, 14♀, black oak, black jack oak; post oak; May 7, 1940, 3♂, 3♀, winged elm, Crataegus, black oak, black jack oak, water oak, red oak. All Georgia material collected by P. W. Fattig. **Oklahoma.** Wichita National Forest, June 6, 1939, 3♂, 2♀, Kaiser—Nailon. **Kentucky.** Adair Co. near Cane Valley, May 22, 1939, 20♂, 21♀, P. O. Ritcher, persimmon, hickory, blackberry. **Kansas.** Kans. Coll. of F. A. Eddy, 2♂, 1♀; Kans. Snow, 1♂; Osage Co., June 14, 1923, W. J. Brown, 1♂, **Nebraska.** May 13, 1♂, H. Pollard.

Types and paratypes in the collection of the University of Arkansas. Additional paratypes in the collections of the U. S. National Museum, University of Kansas, Oklahoma A. and M. College, Ohio State University, Harvard College, the collections of Philip Luginbill, L. W. Saylor, P. W. Fattig, O. L. Cartwright, J. H. Reinhard, C. A. Frost, P. O. Ritcher, and Mark Robinson.

Possibly many of the published records of **corrosa** Lec. actually

refer to **sylvatica**. The most important difference between the two species is in the right clasper of the male genitalia (fig. 8) The ventral abdominal characters and the pubic processes of the females are very similar.

**Phyllophaga inopia** n. sp.

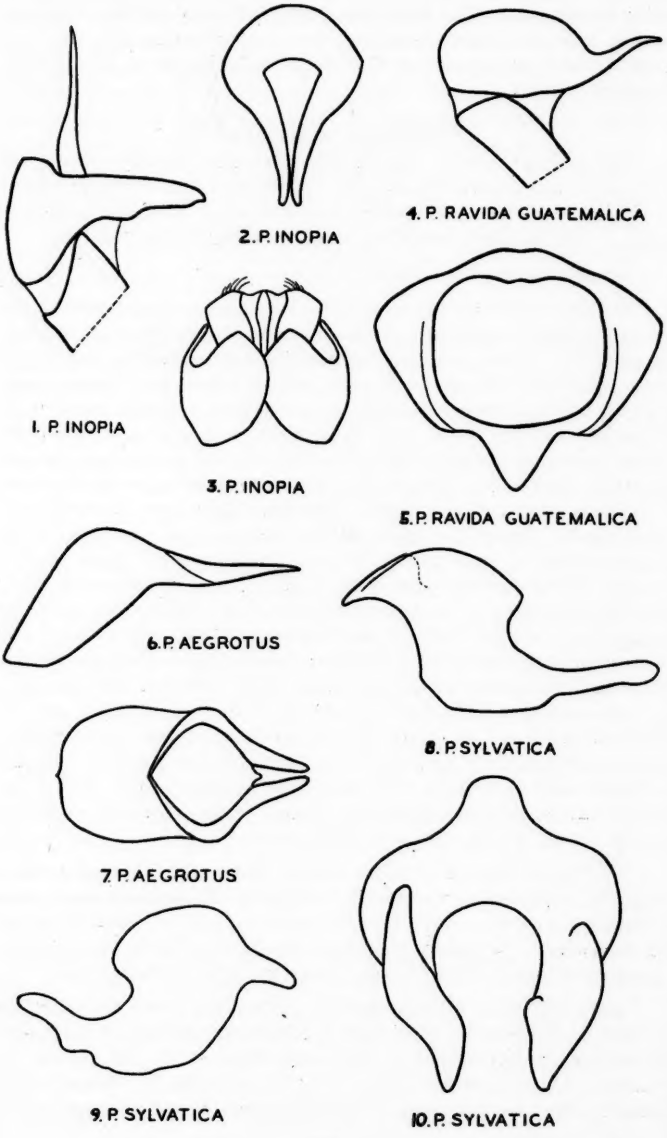
The present species superficially resembles **latidens** Schffr. in size, color, and general appearance. Its body is nearly parallel, light reddish yellow, and the pronotum is distinctly more red than the elytra. The dorsum, except the head, is glabrous and shining.

Length 13-16 mm.; width 6-7.5 mm.

MALE. **Antenna** 10-segmented, club equal in length to funicle. **Clypeus** deeply emarginate, front margin slightly reflexed; surface of clypeus and front coarsely, confluently and confusedly punctured, each puncture with an erect hair; suture impressed; clypeus constricted at base. **Pronotum** twice as wide as long, strongly angulate at sides; base slightly wider than apex; finely and unevenly punctured, space between punctures averaging three or four times their own diameters; front and lateral margins with long hairs some of which are two-thirds length of pronotum. **Hind leg.** Both spurs of hind tibia free, slender, inner spur about three-fourths length of outer; outer spur reaching to basal third of second tarsal segment. Tooth of claw strong, nearly parallel sided in basal two-thirds. **Metasternum** finely and closely punctured, each puncture with long hair of which some are longer than greatest width of middle femur. **Elytra** finely and evenly punctured, punctures separated from once to twice their diameters; sutural, discal and marginal costae obliterated. **Abdomen** convex, slightly impressed at middle, finely punctured on disc, penultimate sternite coarsely punctured on either side of middle to pleural suture, apical sternite three-fourths length of penultimate, coarsely punctured, each puncture with long hair; hind margin of apical sternite with slight emargination; pygidium glabrous, shining, finely punctured, punctures not as closely placed as on disc of elytra.

FEMALE. Distinctly wider behind than male. Club of antenna equal to preceding five segments combined. Penultimate and apical abdominal sternites evenly rounded, punctured as in male, not otherwise modified. Pygidium flattened, evenly punctured, and without tumidity at apex. Tibial spurs closely similar to those of male.

Holotype male, allotype female, Chiricahua Mts., Arizona, July 4, 1940, L. J. Lipovsky, D. E. Hardy, collectors. Additional designated paratypes as follows: 4♂, 7♀, same date, R. H. Beamer, R. C. Kuitert; 3♂, 1♀, same locality, July 13, 1938, R. H. Beamer; 2♂, same locality, April 7, Hubbard and Schwartz, one of which bears the


1. P. INOPIA
2. P. INOPIA
3. P. INOPIA
4. P. RAVIDA GUATEMALICA
5. P. RAVIDA GUATEMALICA
6. P. AEGROTUS
7. P. AEGROTUS
8. P. SYLVATICA
9. P. SYLVATICA
10. P. SYLVATICA

number 1393; 1♂, Huachuca Mts., Arizona, July 18, 1938, R. H. Beamer; 1♂ Cusihuirachic, Chiricahua, Mexico. Types and paratypes located in the F. H. Snow Collection, University of Kansas. Additional paratypes in the collections of the U. S. National Museum, L. W. Saylor, and the University of Arkansas.

In addition to differences in the genitalia, males of this species may be separated from males of **latidens** Schffr. by the more deeply emarginate clypeus, entirely glabrous and punctured surface of the elytra, the shorter and more inclined ultimate abdominal sternite. The female does not have the apex of pygidium tumid as in the female of **latidens.**

### Phyllophaga incuria, new name

**Listrochelus texanus** Lec. 1856. Jour. Ac. N. S. Phila. (2) III, p. 263.
**Phyllophaga texana** Sand. 1937. Jour. Kans. Ent. Soc. 10, p. 16.

Lawrence W. Saylor has recently united Listrochelus (1940) with Phyllophaga as a subgenus which now necessitates the proposal of a new name for **Phyllophaga texana** Sand. The name **texanus** had been previously used by LeConte in Listrochelus. His species is now considered a synonym of **mucorea** LeConte.

### Phyllophaga ravida guatemalica Moser

**Phyllophaga ravida guatemalica** Moser. 1918. Stett. Ent. Zeit. 79, p. 24.

One male of this species was collected at Laredo, Texas, June 5, 1932, by C. E. White, and was determined by Lawrence W. Saylor. This is the first record of the species in the United States. It is closely related to **heterodoxa** Horn and **dentex** Bates from Arizona. The club of the antenna is shorter than the stem, and the pygidium is impunctate and virtually glabrous. From **dentex** it differs further by the short median tooth of the hind tarsal claw. This tooth is only one-half the length of the apical tooth. The genitalia are figured on plate I. Specimen located in the F. H. Snow Collection, University of Kansas.

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EXPLANATION OF PLATE

1. Phyllophaga inopia n. sp., left lateral view of male clasper.
2. Phyllophaga inopia n. sp., caudal view of clasper.
3. Phyllophaga inopia n. sp. pubic process of female.
4. Phyllophaga ravida guatemalica Moser, left lateral view of male clasper.
5. Phyllophaga ravida guatemalica Moser, caudal view of clasper.
6. Phyllophaga aegrotus Bates, left lateral view of male clasper.
7. Phyllophaga aegrotus Bates, caudal view of clasper.
8. Phyllophaga sylvatica n. sp., right lateral view of male clasper.
9. Phyllophaga sylvatica n. sp., left lateral view of clasper.
10. Phyllophaga sylvatica n. sp., caudal view of clasper.

### Phyllophaga gravidula Moser

**Lachnosterna gravidula** Moser. 1921. D. Ent. Zeit., p. 247.
**Phyllophaga perita** Sand. 1937. Jour. Kans. Ent. Soc. 10: p. 14-15.

I have been informed of the synonymy above by Lawrence W. Saylor. He possesses a cotpye of **gravidula** and also a specimen determined for him by Moser. Recently I have examined two males and two females of this species in the Ohio State collection from Patagonia Mts., Arizona. They were collected by D. J. and J. N. Knull one evening, July 20, 1940, in an oak-acacia association.

### Phyllophaga onchophora Chapin

**Phyllophaga onchophora** Chapin. 1932. Ann. Ent. Soc. Amer. 25, p. 184.

One male, Savannah, Georgia, May 2, 1929, P. W. Fattig. This species originally was described from Cuba and may have accidentally entered the United States. Professor Fattig has collected many species and many thousands of Phyllophaga in Georgia, but informs me that this is the only representative of this species he has taken. Collected at light.

### Phyllophaga (Phytalus) aegrotus Bates

**Lachnosterna aegrotus** Bates. 1888. Biol. Centr. Amer. II, 2, p. 182.

One male, Laredo, Texas, June 5, 1932, C. E. White. This species is an addition to the Phyllophaga fauna of the United States. In Saylor's revision of the subgenus Phytalus, (1939), this species traces in his key to the vicinity of **bilobatata** Saylor. However, **aegrotus** differs much from this larger species and is here briefly described.

Length 10.5 mm.; width 5 mm.

MALE. Color light yellow above, disc of head and pronotum brown. **Head** and clypeus strongly punctured, each puncture with a long erect hair; margin of clypeus rather strongly reflexed. Antenna 9-segmented. **Pronotum** glabrous on disc, punctures fine, not closely placed and irregularly distributed; sides subparallell in basal one-half. **Elytra** glabrous, finely and evenly punctured; sutural costa distinct, discal and marginal ones entirely obliterated. **Hind leg.** Both spurs of hind tibia free and slender. All femora with long hairs. Lower tooth of claw shorter than upper and subtruncate at apex. **Abdomen** flattened on disc, finely punctured and with a few short hairs, otherwise unmodified; pygidium glabrous, finely and shallowly punctured, slightly tumid at middle of disc; basal half with a fine, longitudinal, impressed line. The genitalia are figured on plate I. Specimen located in the F. H. Snow Collection, University of Kansas.

LITERATURE CITED

Saylor, L. W. 1939. Revision of the beetles of the Melolonthine subgenus Phytalus of the United States. Proc. U. S. Nat. Mus. 86, p. 157-167.

———. 1940. Revision of the scarabaeid beetles of the Phyllophagan subgenus Listrochelus of the United States, with discussion of related subgenera. Proc. U. S. Nat. Mus. 89, p. 59-60.

# A NEW SPECIES OF DORYCEPHALUS (HOMOPTERA CICADELLIDAE)

R. H. BEAMER*

**Dorycephalus brevis n. sp.**

Resembling D. **delongi** Knull, but much shorter; vertex shorter, but slightly longer than pronotum and elytra; male pygofer short, about as long as four preceding segments of abdomen. Length, male 8 mm., female 10-13 mm.

Vertex highly arched, much more than in **delongi**, appearing as a raised portion with a sharp median carina. Elytra short, about as in **delongi**, but with apex more rounded. Pygofer of female about half as long as distance from its base to apex of elytra, in male almost as long as that distance.

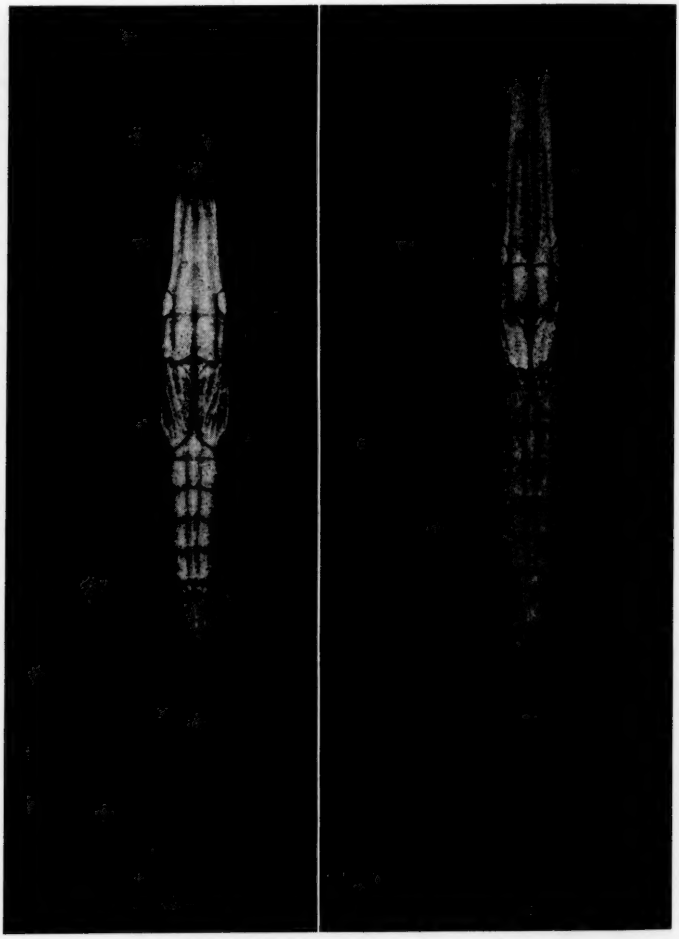
Genitalia: Last ventral segment of female with posterior margin about as in **delongi**, with large median projection and notch either side; distance from tip of last ventral segment to opening of ventral margin of pygofers slightly more than three times as long as from there to apex. Last ventral segment of male shorter than preceeding, with posterior margin slightly concave; valve broadly rounded and barely exposed; plates narrowed almost twice as long as last ventral segment; pygofers about half as long as remainder of the abdomen, ventral margins diverging just beyond apex of plates.

Holotype male, allotype female, paratypes as follows: 20 females and 22 males, Vaughn, New Mexico, June 5, 1933, R. H. Beamer; 26 females and 12 males, Silver City, New Mexico, July 23, 1936, R. H. Beamer. Types in the Snow Entomological Collections.

This species was collected in an awn grass by cutting off the

*Contribution from the Department of Entomology, University of Kansas.

bunches of grass and shaking them out in a net. They live very close to the roots of the plant and are only occasionally taken by sweeping.



D. brevis ♂ D. delongi ♂

# NEW WESTERN ASILIDAE

D. ELMO HARDY, Lawrence, Kansas*

**Stenopogon huachucanus n. sp.**
**(fig. 2a)**

This species is related to **S. kelloggi** Wilcox but is distinguished by its larger size, longer wings, more sparsely bristled thorax, femora blackened dorsally, differences in wing venation as discussed in the description, female abdomen blackish toward apex and sides and venter darker. The male hypopygia are very different (compare figs. 1a and 2a).

**Male.**—All bristles and hairs yellow-white to slightly reddish. **Head:** First two antennal segments yellowish red, third segment and arista black. Third rather short, not quite one-fourth longer than first two segments; arista slender and bristlelike, almost half as long as third antennal segment. Proboscis shining black, palpi brownish. Vestiture of front straw yellow, that of face more whitish while that of occiput and vertex is reddish. **Thorax:** Brownish black in ground color, chiefly yellow-gray pollinose with two faint brownish vittae running longitudinally down the dorsum, the median yellow-gray line separating these is more distinct than in **kelloggi**. Sternopleurae each with a thin patch of long hairs near upper portions, hypopleurae with fine hairs. Bristles of dorsum largely confined to the margins with no strong dorsocentrals in front of the transverse suture; dorsum in front of suture covered with short, somewhat appressed brown hairs. The hind portion of the thorax is much more densely bristled in **kelloggi**, the strong dorsocentral bristles extend in front of the transverse suture and the hair on the frontal portion is more elongate, yellowish and erect. Humeri reddish, halteres yellow. **Legs:** Chiefly yellow-red, coxae blackish with a rufous tinge, dorsal portions of femora blackened. Bases of tarsal claws yellow, apical three-fourths black. **Wings:** Faintly iridescent, veins brown except at extreme wing bases, where they are yellowish. Costa with dense yellow hair on basal portion. Crossvein r-m situated just before middle of distal cell instead of at basal half as in **kelloggi** and near the middle of vein $R_{4+5}$. Petiole of first posterior cell rather short, about equal to length of r-m crossvein. Petiole of fourth posterior cell just slightly longer than r-m crossvein. Crossvein m less than one-third the length of $M_3$ before the crossvein, instead of more than half its length as in **kelloggi**. Cubital cell just barely closed in the wing margin. **Abdomen:** Yellow-red, base of first tergum, lateral margins and narrow bases of second

*Contribution from the Department of Entomology, University of Kansas.

bunches of grass and shaking them out in a net. They live very close to the roots of the plant and are only occasionally taken by sweeping.

D. brevis ♂ D. delongi ♂

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**Male.**—All bristles and hairs yellow-white to slightly reddish. **Head:** First two antennal segments yellowish red, third segment and arista black. Third rather short, not quite one-fourth longer than first two segments; arista slender and bristlelike, almost half as long as third antennal segment. Proboscis shining black, palpi brownish. Vestiture of front straw yellow, that of face more whitish while that of occiput and vertex is reddish. **Thorax:** Brownish black in ground color, chiefly yellow-gray pollinose with two faint brownish vittae running longitudinally down the dorsum, the median yellow-gray line separating these is more distinct than in **kelloggi.** Sternopleurae each with a thin patch of long hairs near upper portions, hypopleurae with fine hairs. Bristles of dorsum largely confined to the margins with no strong dorsocentrals in front of the transverse suture; dorsum in front of suture covered with short, somewhat appressed brown hairs. The hind portion of the thorax is much more densely bristled in **kelloggi,** the strong dorsocentral bristles extend in front of the transverse suture and the hair on the frontal portion is more elongate, yellowish and erect. Humeri reddish, halteres yellow. **Legs:** Chiefly yellow-red, coxae blackish with a rufous tinge, dorsal portions of femora blackened. Bases of tarsal claws yellow, apical three-fourths black. **Wings:** Faintly iridescent, veins brown except at extreme wing bases, where they are yellowish. Costa with dense yellow hair on basal portion. Crossvein r-m situated just before middle of distal cell instead of at basal half as in **kelloggi** and near the middle of vein $R_{4+5}$. Petiole of first posterior cell rather short, about equal to length of r-m crossvein. Petiole of fourth posterior cell just slightly longer than r-m crossvein. Crossvein m less than one-third the length of $M_3$ before the crossvein, instead of more than half its length as in **kelloggi.** Cubital cell just barely closed in the wing margin. **Abdomen:** Yellow-red, base of first tergum, lateral margins and narrow bases of second

*Contribution from the Department of Entomology, University of Kansas.

terga blackish. Hairs and bristles of abdomen reddish. Hypopygium yellowish red, somewhat more shining than the abdominal terga. The ninth tergum is deeply cleft and similar to **kelloggi** except that the apices are more broad and rather acutely pointed on inner margins. The plate beneath the coxopodite is densely haired, rather square topped on posterior margin with a 'V' shaped concavity in middle portion, instead of the entire hind margin being broadly 'V' shaped as in **kelloggi**. The coxopodite is modified into a pair of large lateral lobes, these are broad and somewhat rounding apically each with a small hairy lobe on outer margin and with a long fingerlike lobe extending to about the middle line on inner margin. The clasping structures are long, narrow and tapered slightly at apices (fig. 2a). The aedeagus is much more narrow than in **kelloggi**.

Length: body, 16-17 mm.; wing, 8.8-9.3 mm.

**Female.**—Apex of abdomen blackish, sides and venter of abdomen discolored with black. Apical spines reddish. Bristles almost entirely white, hairs more consistently whitish. Otherwise like the male.

Holotype male, Huachuca Mts., Arizona, July 18, 1938 (Jean Russell). Allotype female and two paratypes, one male, one female, same locality and date (R. H. Beamer, Jean Russell). All in Snow Entomological Collection.

### The pictipes complex of the genus Leptogaster

The pictipes complex includes those Leptogaster, exclusive of the subgenus Psilonyx (those having no empodia), having the fourth posterior cell ($M_3$) sessile or nearly so at its base, the base of vein $M_2$ sharply bent forming a distinct angle with the m crossvein and the base of $M_2$ equal or shorter than m crossvein (fig. 3a); instead of the fourth posterior cell being petiolate at base or $M_2$ being straight for its entire length, the basal portion not distinctly bent. **Leptogaster brevicornis** Loew has the fourth posterior cell sessile but vein $M_2$ is straight, the basal portion is usually twice the length of m crossvein and the third antennal segment is ovate and shorter than its style. The mystax of **brevicornis** is made up of many closely set bristles while in the known species of the pictipes group it is composed of a few pairs of distinctly spaced bristles.

Key to species based upon males

1. Lobes of ninth tergum bifid at apices (figs. 3b, c) ..... **bifidus** n. sp.
   Lobes not as above ..... 2
2. Lobes of tergum long and slender, acutely pointed at apices (figs. 4a, b) ..... **floridensis** Johnson

Lobes not greatly elongated, rather thick and square topped at apices ----------3

3. Plates above cerci short, two times as wide as their greatest width (fig. 6b) ----------**pictipes** Loew

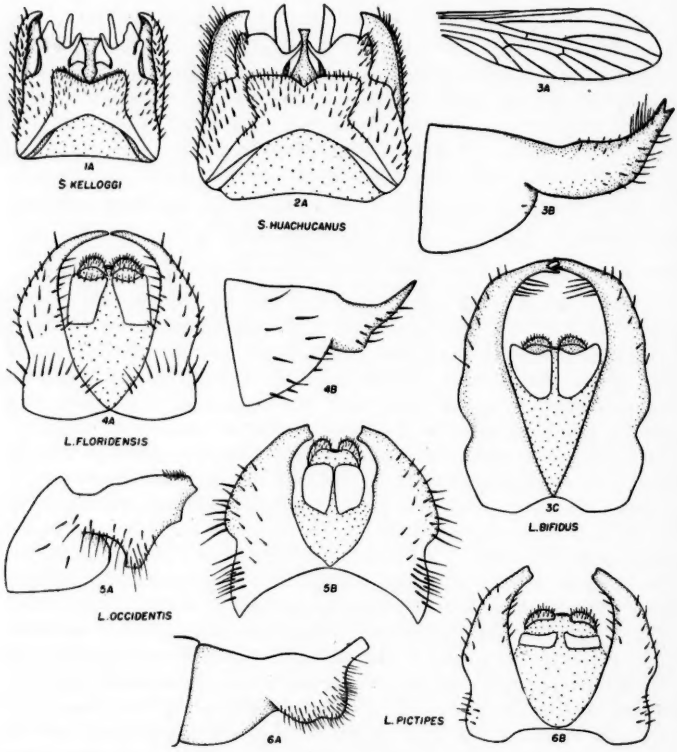
Plates above cerci much longer than wide (fig. 5b)------ ---------- **occidentis** n. sp.

**Leptogaster bifidus** n. sp.
(fig. 3a-c)

This species is related to **pictipes** Loew but the male genitalia are strikingly different. They are most easily distinguished by the elongate, apically forked lobes of the ninth tergum.

**Male.—Head:** Mystax composed of four to six long white bristles. Face grayish pubescent with a subshining black stripe down the middle. First two antennal segments yellow; third largely black, with broad yellow base. Third antennal segment rather elongate, about one-fourth longer than first two segments; style long and slender, about equal to or but slightly longer than third segment. Pubescence and bristles of occiput white. **Thorax:** Black in ground color, silvery gray pubescent on the sides and grayish brown on the dorsum, with two very faint gray, longitudinal vittae. The pair of presutural bristles are yellow and supra-alars are black with the bases slightly yellowed. Humeri faintly tinged with yellow. Halteres yellow with the knobs slightly discolored. **Legs:** Chiefly yellow. Hind femora rather strongly swollen on apical portions, hind tibiae slightly so. Posterior femora and tibiae each with a pair of brownish to black rings, the apices of the tibiae are broadly banded while the femora are narrowly so; the tibiae possess a broad band near the median portions while the corresponding bands of the hind femora are at about the apical one-third. Front two pairs of legs entirely yellow, tarsal claws black; posterior tarsi yellowish brown. Empodium present. The wing venation (fig. 3a) is identical with **pictipes.** **Abdomen:** Subshining brownish black in ground color, lightly gray pruinose; apices of segments two to five narrowly yellow. Apical portion of abdomen swollen and more blackish. **Hypopygium:** Lobes of ninth tergum large and well developed, extending about as long as last two abdominal segments, these lobes are bifid at their apices (fig. 3b, c).

**Female.**—The gray vittae of the mesonotum are more distinct and the pleurae more densely pubescent, otherwise like the male except for genital characters. The females are not separable from those of **floridensis** Johnson except when accompanied by males or upon geographic distribution; the first two antennal segments are




EXPLANATION OF FIGURES

Fig. 1. **Stenopogon kelloggi** Wilcox, a. male hypopygium, ventral view with anal region and cerci dissected off.

Fig. 2. **S. huachucanus** n. sp. a. ventral of hypopygium without anal region or cerci.

Fig. 3. **Leptogaster bifidus** n. sp. a. wing. b. ninth tergum of male, lateral c. male hypopygium, dorsal.

Fig. 4. **L. floridensis** Johnson, a. male hypopygium, dorsal. b. ninth tergum of male, lateral.

Fig. 5. **L. occidentis** n. sp., a. ninth tergum, lateral. b. hypopygium, dorsal.

Fig. 6. **L. pictipes** Loew, a. ninth tergum, lateral. b. hypopygium, dorsal.

more consistently yellowed and the gray vittae of the dorsum more distinct.

Holotype male, Ruby, Arizona, July 13, 1940 (R. H. Beamer). Allotype female and eighteen paratypes, ten males and eight females: same locality, July 22, 1938-July 13, 1940 (R. H. Beamer, D. E. Hardy); Santa Rita Mts., Ariz. VIII-1-41 (R. H. Beamer, L. H. Banker and B. Hodgden); Huachuca Mts., Ariz. VII-30-41 (R. H. Beamer) and Arivaca, Ariz. VII-26-41 (E. L. Todd). All in Snow Entomological Collection.

**Leptogaster occidentis** n. sp.

(figs. 5a-b)

This species is best distinguished from **pictipes** Loew by genital characters. It is most easily separated by the elongated plates above the cerci and the strong development of the lower portion of the plates of the ninth tergum as seen from lateral view.

**Male.**—Fitting for the most part the description of **bifidus** n. sp., the presutural bristles, however, are black; the humeri are black and the knobs of halteres more brownish, the posterior femora are not so strongly swollen and the leg coloration is different. The dilated portion of the hind femora is almost entirely black with only a narrow yellow band separating it from the apical band. The apical halves of the hind tibiae are brownish black, the last four subsegments of the tarsi are brownish and the tibiae are more thickly covered with white pile. The apical portion of the abdomen and the genitalia are thickly white pilose. **Hypopygium:** Polished brown to black. Plates of ninth tergum broad and square tipped, extending about the length of the last abdominal segment. From lateral view the lower margin of each plate is rather strongly produced and has a deep indentation at about the median portion (fig. 5a). Plates above cerci decidedly longer than wide (fig. 5b).

The females cannot be distinguished conveniently from those of **pictipes** unless accompanied by the male.

Holotype male, Chiricahua Mts., Arizona, July 4, 1940 (D. E. Hardy). Allotype female, Sunnyside Canyon, Huachuca Mts., Arizona, July 9, 1940 (R. H. Beamer). Nine paratypes, five males, four females, from following localities: Same data as holotype; same locality as allotype (R. H. Beamer, L. C. Kuitert, R. I. Sailer, D. E. Hardy); Mountain Park, New Mexico, June 27, 1940 (R. H. Beamer, D. E. Hardy), and Santa Rita, Mts., Arizona, July 19, 1938 (R. I. Sailer). All in Snow Entomological Collection.

# CONCERNING TRICHOCORIXELLA JACZEWSKI (HEMIPTERA-CORIXIDAE)

H. B. HUNGERFORD, Lawrence, Kansas*

**Trichocorixella Jacz., 1931**

T. Jaczewski, 1931. Annales Musei Zoologici Polonici. IX., Nr. 15, pp. 217-218.

In his studies on Mexican Corixidae, Dr. Jaczewski established the genus **Trichocorixella** for a species which he named **T. wolskii.** He had before him 3 males and 15 females. The males were sinstral and the series was from Mexico, D. F., Chapultepec. I had described previously (1927) under the name **Palmacorixa mexicana** a species from a single pair of specimens from Xochimilco Sea, Mexico, D. F. The solitary male was dextral. Since that time I have examined the following.

3 specimens "Mexico, D. F., April 22-25, 1910." 2 of them males. 1 sinstral, 1 dextral.

13 specimens "Tres Cumbres, Morelos, 70 kil. south of Mexico City, Oct. 1, 1938. H. D. Thomas." 7 of them males, 3 sinstral, 4 dextral.

27 specimens "Mexico, D. F., Xochimilco, June 21, 1934. H. Hinton." 11 of them males, 4 sinstral, 7 dextral.

13 specimens "Mexico, Puebla, Puebla, July 24, 1937. H. D. Thomas." 3 of them males, 1 sinstral, 2 dextral.

34 specimens "Mexico, Tehuacan, Puebla, July 18-25, 1937. H. D. Thomas." 16 of them males, 8 sinstral, 8 dextral.

84 specimens "Mexico, Chapultepec, D. F., Aug. 10, 1937. H. D. Thomas." 21 of them males, 7 sinstral, 14 dextral.

Thus, in a total of 60 males we find 24 sinstral and 36 dextral, and both right and left asymmetry represented in all six lots.

The genus **Trichocorixella** is defined by Dr. Jaczewski as follows:

"Abdominal asymmetry in the males sinistral, genital armature directed leftwards. Strigil present. Front tibiae and palae of males as in **Trichocorixa** Kirk., but the palae with two rows of stridulatory pegs, one of these rows forming the central portion of a row of unmodified bristles. Pattern of the hemelytra of the **Trichocorixa** type, membranal suture not marked by a pale oblique stripe, pale markings of corium being continued over the membrane without any interruption. Generic type **Trichocorixella wolskii** n. sp."

I am convinced that **Trichocorixella wolskii** Jaczewski 1931 is a synonym of **Palmacorixa mexicana** Hungerford 1927 (Pan-Pacific Entomologist, Vol. IV, No. 2, p. 94.)

*Contribution from the Department of Entomology, University of Kansas.

In view of G. Stuart Walley's careful re-description of **Palmacorixa** Abbott (Can, Ent. LXII, pp. 99-106, 1930, I am inclined to consider that **Trichocorixella** Jaczewski is a good genus and, therefore, that **Palmacorixa mexicana** Hungerford should be **Trichocorixella mexicana** (Hungerford).

Moreover, **Trichocorixella** is a genus where there is marked instability in the male asymmetry, a condition seen also in **Krizousacorixa** Hungerford and to a less degree in **Corisella** Lundblad, and the generic diagnosis should be modified since, at present, we know more dextral than sinstral males.

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## RHOPALIDAE A. & S. FOR CORIZIDAE D. & S. (HEMIPTERA)

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Among the older workers there was considerable difference of opinion concerning the rank and the name to be given to this group of bugs. Modern systematists are largely agreed that the group is deserving of family rank but the matter of the proper name for them is still unsettled. In general, European workers have used Rhopalidae (or Rhopalinae) where American workers use Corizidae (or Corizinae). China however, in a recent study of the British species uses the subfamily name **Corizinae** (Ent. Mo. Mag., 77:273-278, 1941). Essentially the problem hinges upon the rank to be accorded the sub groups,—are they genera or subgenera, what are their type species and what names have priority? Also the old question of what constitutes the type genus of a family is involved.

The oldest generic name in the family is **Coryna**, proposed by J. F. Wolff in 1811 for the **Lygaeus sidae** of Fabricius. This name of Wolff's, along with some other genera proposed in the same work, was overlooked by hemipterists until Schumacher (1922) and McAtee and Malloch (1923) called attention to it. Sherborn lists **Coryna** Wolff as a nomen nudum and later says of it, "name and figure only." McAtee and Malloch have pointed out that Wolff gives a description as well as a figure to which his "No. 187 **Coryna**, Keulenwanze" refers. Sherborn therefore was in error in citing **Coryna** Wolff as a nomen nudum. There is, however, a question of priority. Agassiz lists **Coryna** Gärtner as occurring in Pallas, Elenchus Zoöphytorum, published in 1766. Sherborn states that he was unable to locate the

reference. McAtee and Malloch report that they inspected the work cited in vain and Schulze does not cite the 1766 usage. There is a **Coryne** Gaertner, 1774 (Hydroids). In 1802 Le Bosc used **Coryna** for the **Coryne** of Gaertner. Without having access to Le Bosc's work it had appeared to me that his use of **Coryna** was an error of typography and therefore did not affect Wolff's 1811 usage in the Hemiptera. Were this the case **Coryna** Wolff, haplotype, **Coreus sidae** Fabricius, would have precedence over some later proposed genera and would affect the family name. Mr. H. G. Barber, to whom I am greatly indebted for this as well as for many other favors, has examined Bosc's "Histoire Naturelle des Vers" for me and writes that Bosc's use of **Coryna** actually was an emendation of the French form of the word **Coryne** used by Gaertner. **Coryna** 1802, thus is an objective synonym of **Coryne** 1776 and invalidates Wolff's later use of **Coryna** in a different sense. **Coryna** Wolff therefore is a dead homonym. (For parallel cases see opinions 120 and 125, international Commission Zoological Nomenclature).

The next oldest genus and the oldest valid one in the family is **Corizus** Fallen, 1814 (type, **hyoscyami** L.).

The first name for these insects recognizable as specifically designating a category that ranks greater than the genus is **Rhopalides** of Amyot and Serville (1843). This was followed by **Rhopalidae** Dallas (1852), and **Rhopalidae** Stal (1860). In 1865 Douglas and Scott used **Corizidae** and in 1868 (1866) Mayr, in his Novara Hemiptera, used **Corizida.**

If one is to recognize the oldest valid genus in a family as type genus of that family (vide Kirkaldy and McAtee) the name of the family becomes **Corizidae.** On the other hand, if we follow the other school of thought (Horvath, VanDuzee, and Bradley, also Opinion 133, International Commission Zool. Nomenclature) in the much more logical practice and recognize as type genus of a family the genus whose stem enters into the formation of the earliest proposed category of greater rank than the genus, then the type genus becomes **Rhopalus** Schilling and the family name **Rhopalidae** A. and S. But as stated above the problem is further complicated by the doubt that exists regarding the status of the genera involved. If we rank **Rhopalus** as a subgenus in the older genus **Corizus** the proper family name again becomes **Corizidae** but must be accredited to Douglas and Scott, rather than Mayr as has been the custom of American workers. At the present status of my study of the group it is my opinion that the type species of **Rhopalus** Schilling and the type species of **Corizus** Fallen, namely **R. subrufus** (Gmel.) and **C. hyoscyami** (Linn.) are not congeneric. I would therefore use the family name Rhopalidae.

# HOST PLANT RECORDS OF CERCOPIDAE IN NORTH AMERICA, NORTH OF MEXICO (HOMOPTERA)

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**Abstract**

An alphabetical list of the recorded host plants of the known species of Cercopidae in North America, North of Mexico is presented. Common names and scientific names for both insects and plants as well as family names are alphabetized. Brief discussions are given of the subterranean feeding habits of certain species and egg deposition of all genera except **Aphrophora**. For eighteen out of the total fifty-six species no host records of any sort have been recorded.

## Purpose of the Paper

The primary object of this paper is to give a summary of our present knowledge concerning the relationship between the recognized species of this one family of insects and their plant hosts. In this way it is hoped that interest will be stimulated in the feeding habits of the group and thus new host plant records will be noted. The writer would greatly appreciate any material sent to her. If collectors would take time out while collecting in their own groups to also collect any Cercopid nymphs with adults that they might see and send in a small vial of them, together with all possisble data concerning the host plant on which they are feeding, real progress could soon be made toward making the host plant records complete for the entire family.

## Feeding Habits

The more usual habits are the feeding of the nymphs on the leaves or stem when the familiar spittle masses are readily seen. There are, however, several species which practice subterranean feeding or else are concealed in some way. **Aphrophora angulata** Ball was found feeding in the enlarged sheath of **Heracleum lanatum** Michx (Ball, 1915). The sheath when broken showed masses of froth and nymphs. **Aphrophora permutata** Uhler feeds at the base of the clumps or often below surface among roots on **Chrysopis villosa** (Pursh.) Nutt and **Lupinus** sp., (Ball, 1901). **Aphrophora annulata** Ball was found on the crown of **Artemisia ludoviciana** Nutt, (Ball, 1915). Froth masses of **Tomaspis bicincta** Say were found in damp clumps of grass and some partly below ground (Ball, 1938). **Philaronia abjecta** (Uhl.) was found on the roots and crowns of **Lupine** and **Geranium** in the mountains of Colorado (Ball, 1915).

*Contribution from the Department of Entomology, University of Kansas.

### Egg Deposition

Eggs have been found for all the genera except **Aphrophora** (Garman, 1925). The usual places are either in the dead stems, sheath of growing plant or beneath the bark. Specific observations which have been described are as follows:

**Aphrophora salicis** DeGeer in Arnold Arboretum in the terminal twigs of willow with 1-2 eggs for each puncture (Metcalf and Barber, 1929).

**Clastoptera obtusa** Say. In September and October laid in bark of alder frequently behind bud and in July on new growth in slits. (Garman, 1923).

**Clastoptera proteus** Fitch. Beneath bark on outer twigs and one to three eggs per puncture.

**Lepyronia quadrangularis** Say. In spring in rotten stems and twigs, (Doering, 1923 and Garman, 1923).

**Tomaspis bicincta** (Say). Eggs laid on stems of plants in autumn. (Harris).

**Philaenus lineatus** (Linn.). Female does not thrust her ovipositor through any portion of plant tissue but merely inserts the eggs between stalk and leaf sheath within 2 or 3 inches of ground. There are 2 - 24 eggs in a mass and each mass is surrounded with a white, frothy material that is tough and inelastic. (Barber and Ellis, 1922).

**Philaenus leucophthalmus** (Linn). Eggs in single rows, 2 - 18 eggs to a mass and covered by a protective material. (Barber and Ellis, 1922).

**Philaronia bilineata** (Say). Eggs in a single row with five eggs per mass and covered by a protective material. (Barber and Ellis, 1922).

### Plant Families Recorded

A total of thirty-eight families of plants are given in the present list. It does not always follow, however, that every plant represented means actual feeding since many adults have been taken while sweeping and this does not mean that a particular plant is necessarily the host plant. Of the thirty-eight families listed, twenty-seven families are represented by only one to three species of plants and eleven families by four or more. The families having the most records are Compositae 33, Pinaceae 12, Gramineae 11, Betulaceae 10, Rosaceae 7, Salicaceae 7, and Cornaceae 6.

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## Host Plants

*Names starred means that nymphs have been found feeding on the plant.

Acacia (False). See **Robinia pseudoacacia L.**

Acanthaceae. See
**Ruellia ciliosa Pursh.**
**Ruellia parviflora** (Nees) Britton.

**Acer** sp. Maple sp. See
**Clastoptera achatina** Germ.
**Lepyronia quadrangularis** (Say).
**Philaenus leucophthalmus** Linn.
**Philaenus lineatus** L.

Aceraceae. See **Acer**, maple sp.

**Aesculus** L. Horse chestnut. See **Clastoptera obtusa** var. obtusa (Say).

**Aesculus parviflora** Walt. Horse chestnut. See **Philaenus leucophthalmus** L.

**Agrimonia gyrposepala** Wallr. See **Lepyronia quadrangularis** (Say).

Agrimony. See **Agrimonia gyrposepala** Wallr.

Alder sp. See **Alnus** sp.

Alder (Hoary). See **Alnus incana** (L) Willd.

Alder (Smooth). See **Alnus rugosa** Spreng.

Alder (Speckled). See **Alnus incana** (L) Willd.

Alder Spittle-bug. See **Clastoptera obtusa** (Say).

Alfalfa. See **Medicago sativa L.**

**Alnus** sp. Alder. See
**Clastoptera obtusa** var. **borealis** Ball.
**Clastoptera obtusa** var. **tristis** Van Duz.

**Alnus incana** (L) Willd. Speckled or Hoary Alder. See **Clastoptera obtusa var. tristis** Van Duz.

**Alnus rugosa** Spreng. Smooth Alder. See **Clastoptera obtusa** var. **obtusa** (Say).

**Alnus serrulata**=**Alnus rugosa** Spreng.

**Alyssum** L. See **Philaenus leucophthalmus**. L.

**Ambrosia** sp. See **Clastoptera xanthocephala** var. **xanthocephala** Germ.

**Ambrosia elatior** L. Ragweed, Roman Wormwood, Hogwood, Wild Tansy. See

**Clastoptera xanthocephala** var. **unicolor** Fowl.
**Lepyronia quadrangularis** (Say).

**Ambrosia trifida** L. Horse Cane, Horseweed, Bitterweed, Great Ragweed. See
**Lepyronia quadrangularis** (Say).
**Clastoptera xanthocephala** var. **xanthocephala** Germ.

Amy-root. See **Apocynum cannabinum** L.

Anacardiaceae. See **Rhus glabra** L.

**Andropogan furcatus** Muhl. See **Lepyronia quadrangularis** (Say).

Anonaceae. See **Asimina triloba** (L.) Dunal.

**Anthemis arvensis** L. Corn or Field Camomile. See
**Clastoptera xanthocephala** var. **xanthocephala** Germ.

***Aphrophora angulata** Ball.
***Heracleum lanatum** Michx. Giant Umbellifera, Cow-Parsnip or Master-wort, (nymphs, Ball); **Salix**, willow (adults, Ball and Van Duzee).

***Aphrophora annulata** Ball.
***Artemisia ludoviciana** Nutt. Dark-leaved Mugwort or Sage, (nymphs, Ball); **Pinus**, pine (adults, Ball).

**Aphrophora canadensis** Walley.

**Aphrophora detritus** Walker.

**Aphrophora fulva** Doering. **Pinus sabiniana** Dougl., digger pine (adults, Beamer).

**Aphrophora irrorata** Ball. **Pinus**, pine (adults but no nymphs, Ball); **Populus tremuloides** Michx., American Aspen (adult female only, Doering).

**Aphrophora maculosa** Doering.

***Aphrophora parrallela** (Say). The Pine Spittle-bug. **Pinus banksiana** Lamb. Jack pine or Grey pine of North (adults, Beamer); **Pinus rigida** Mill. Pitch Pine (adults, Smith); ***Pinus strobus** L. Weymouth or White Pine (nymphs, Ball and Fitch); ***Pinus sylvestris** L. Scotch or Scots Pine (nymphs, Ball and Fitch); **Tsuga canadensis** Carr., Hemlock (adults, Van Duz.).

***Aphrophora permutata** Uhler.
***Chrysopsis villosa** (Pursh.) Nutt., Hairy Golden Aster (nymphs at base of clumps and on roots, Ball); ***Lupinus** sp. (nymphs at base of clumps and on roots, always near pines, Ball); **Pinus**, pine sp. (adults, Ball); *many weeds (nymphs and adults, Beamer); ***Sambucus callicarpus** Greene (nymphs and adults, causing contortion of leaflets, National Museum data).

**Aphrophora princeps** Walley.

**Aphrophora punctipes** Walley.

*Aphrophora salicis De Geer. *Salix nigra Marsh., Black Willow; *Salix petiolaris Smith and many species of willow (in Arnold Arboretum, nymphs, Metcalf and Bruner).

*Aphrophora saratogensis (Fitch). *Ferns, always beneath pines (nymphs, Ball); Larix laricina (Du Roi) Koch., American Larch or Tamarack (adults, Beamer); Pinus banksiana Lamb., Jack Pine (adults, Beamer); Pinus rigida Mill., Pitch pine (adults, Fitch); Pinus strobus L., Weymouth or White pine (adults, Fitch).

*Aphrophora signoreti Fitch. Pinus, pine (adults, Ball); *Vitis sp. grape (nymphs, Ball, Fitch).

*Aphrophora quadrinotata Say. The Grape Spittle-bug. Grass and low vegetation (nymphs, Ball); Vernonia interior=Vernonia Baldwinii Torr, Baldwin's Ironweed (nymphs, Schwitzgebel).

Aplopappus acradensius. See Clastoptera lineatocollis Stal.

Apocynaceae. See
Apocynum cannabinum L.
Apocynum pubescens R. Br.

Apocynum cannabium L. Indian Hemp, Amy-root, Dogbane. See Lepyronia quadrangularis (Say).

Apocynum pubescens R. Br. Velvet Dog-bane. See Lepyronia quadrangularis (Say).

Arbor-vitae. See Thuja occidentalis L.

Arctostaphylos uva-ursi Spreng. Bearberry. See Clastoptera saintcyri var. anceps McAtee

Aronia Pers. Chokeberry. See Philaenus leucophthalmus L.

Artemisia dracunculoides Pursh. Linear-leaved Wormwood. See Clastoptera lineatocollis Stal.

Artemisia ludoviciana Nutt. See Aphrophora annulata Ball.

Artemisia tridentata Nutt. Sagebrush. See
Clastoptera binotata Ball, Clastoptera brunnea Ball,
Clastoptera delicata Uhl., Clastoptera lineatocollis Stal.

Ascelepiadaceae. See
Ascelpias syriaca L.
Ascelpias tuberosa L.
Ascelpias verticillata L.

Asclepias syriaca L. Common Milkweed. See
Lepyronia quadrangularis (Say).

Asclepias tuberosa L. Butterfly Weed or Pleurisy Root. See
Lepyronia quadrangularis (Say).

Asclepias verticillata L. Whorled Milkweed. See
Lepyronia quadrangularis (Say).

Asimina triloba (L) Dunal. North American Papaw. See
Clastoptera obtusa var. obtusa (Say),

**Clastoptera obtusa** var. **borealis** Ball.

Aspen. See **Populus tremuloides** Michx.

Aster, (Hairy Golden). See **Chrysopis villosa** (Pursh.) Nutt.

Aster, (Panicled). See **Aster paniculatum** Lam.

Aster, (Tall white). See **Aster paniculatus** Lam.

Aster, (Willow). See **Aster salicifolius** Lam.

**Aster paniculatus** Lam. Tall white or Panicled Aster. See **Lepyronia quadrangularis** (Say).

**Aster salicifolius** Lam. **Willow Aster.** See **Lepyronia quadrangularis** (Say).

Avens (Yellow). See **Geum strictum** Ait.

Avens (White). See **Geum canadense** Jacq.

**Azalea nudiflora** L. Honey Suckle. See **Clastoptera obtusa** var. **obtusa** (Say).

Barberry. See **Berberis** L.

Basswood. See **Tilia americana** L.

Bearberry. See **Arctostaphylos uva-ursi** Spreng.

**Berberis** L. Barberry. See **Philaenus leucophthalmus** L.

**Betula** sp. See **Clastoptera elongata** Doer.

**Betula lutea** Michx. Yellow Birch or Gray Birch. See **Clastoptera obtusa** var. **obtusa** (Say).

**Betula populifolia** Ait. American White Birch. See **Clastoptera obtusa** var. **obtusa** (Say).

**Betulaceae.** See

**Alnus** sp.
**Alnus incana** (L) Willd.
**Alnus rugosa** Spreng.
**Alnus serrulata**=**Alnus rugosa.**
**Betula.** sp.
**Betula lutea** Michx.
**Betula populifolia** Ait.
**Corylus** sp.
**Corylus rostrata** Ait.
**Ostrya virginiana** (Mill.) Willd.

Birch sp. See **Betula** sp.

Birch (American White). See **Betula populifolia** Ait.

Birch (Gray). See **Betula lutea** Michx.

Birch (Yellow). See **Betula lutea** Michx.

Bitterweed. See **Ambrosis trifida** L.

Blackberry sp. See **Rubus** sp.

Blackberry (Running). See **Rubus canadensis** L.

Bladdernut. See **Staphylea** L.

Bladder-Senna. See **Colutea** L.

Blowball. See **Leontodon taraxacum** L.
Blueberry sp. See **Vaccinum** sp.
Blueberry (Dwarf). See **Vaccinum pennsylvanicum** Lam.
Blueberry (Lowbush). See **Vaccinum pennsylvanicum** Lam.
Blueberry (Sugar). See **Vaccinum pennsylvanicum** Lam.
Blueberry Spittle-bug. See **Clastoptera proteus** var. **nigricollis** Fitch.
**Bromus secalinus** L. Chess or Cheat. See **Lepyronia quadrangularis** (Say).
Broom. See **Cytisus** (Tourn.) L.
Buckeye. See **Aesculus parviflora** Walt.
Burning Bush. See **Euonymus** L.
Burro-weed. See **Franseria dumosa** Gray.
Butterfly Weed. See **Asclepias tuberosa** L.
Butternut. See **Juglans cinerea** L.
Cactus. See **Salsola pestifer** A. Nelson.
Callicarpa L. See **Philaenus leucophthalmus** L.
Camomile (Corn or Field). See **Anthemis arvensis** L.
Candytuft. See **Iberis** sp.
Caprifoliaceae. See **Symphoricarpos orbiculatus** Moench.
Carex sp. Sedge sp. See
**Lepyronia quadrangularis** (Say).
**Philaenus parallelus** Stearns.
Carya sp. Hickory. (Also **Hicoria**). See
**Clastoptera achatina** Germ.
**Clastoptera obtusa** var. **obtusa** (Say).
Carya alba Britton. White Heart Hickory. See **Clastoptera achatina** Germ.
Carya pecan Engl. and Graebn. Pecan. See
**Clastoptera achatina** Germ.
**Clastoptera texana** Doering.
Cedar sp. See **Juniperus** sp.
Cedar (Red). See **Juniperus virginiana** L.
Cedar (White). See **Thuja occidentalis** L.
Cheat. See **Bromus secalinus** L.
Chenopodiaceae. See
**Chenopodium album** L.
**Salsola pestifer** A. Nels.
Chenopodium album L. White Goosefoot, Pigweed. See **Lepyronia quadrangularis** (Say).
Chestnut, Horse. See **Aesculus** sp. and **Aesculus parviflora** L.
Chess. See **Bromus secalinus** L.
Chokeberry. See **Aronia** Pers.
Chrysanthemum sp. See **Clastoptera xanthocephala** var. **unicolor** Fowl.

**Chrysothamnus graveolans** Greene. Rabbit Brush. See **Clastoptera brunnea** Ball, **Clastoptera delicata** Uhl.

**Chrysothamnus nauseolus** var. **speciosus** Hall. See **Clastoptera lineatocollis** Stal.

**Chrysothamnus viscidiflorus** var. **puberulus** Jepson. See **Philaronia abjecta** Uhl.

**Chrysopis villosa** (Pursh.) Nutt. See **Aphrophora permutata** Uhl.

Clover (Sweet White). See **Melilotus alba** Desv.

Cicely (Wooly Sweet). See **Washingtonia claytoni** (Michx.) Britton.

Cichoriaceae. See
**Lactuca canadensis** L.
**Lactuca irrosa** L.
**Lactuca pulchella** (Purch.) DC.
**Lactuca spicata** (Lam.) Hitchc.

**Cirsium altissimum** (L) Spreng. Tall or Roadside Thistle. See **Lepyronia quadrangularis** (Say).

***Clastoptera achatina** Germ. **Acer** sp. maple (adults, Wirtner); **Carya alba** Britton, White Heart Hickory (adults, Beamer); **Carya** sp. (adults, Wirtner); ***Carya** sp. (nymphs, Garman); ***Carya pecan** Engl. and Graebn., Pecan (National Museum Record); **Corylus** sp. Hazel's (adults, Wirtner); **Tilia** sp. Linden (adults in Arnold Arboretum, Morrison).

**Clastoptera arborina** Ball. **Thuja occidentalis** L., White Cedar or Arbor Vitae (adults, Ball); **Juniperus virginiana** L. Red Cedar (Nat. Mus. record).

**Clastoptera arizonana** Doer.

***Clastoptera binotata** Ball. **Artemisia tridentata** Nutt, sagebrush (adults, Ball, Gill. and Bak.); *Mentha sp., mint (one nymph and numerous adults, Ball).

**Clastoptera brunnea** Ball. **Artemisia tridentata** Nutt, Sagebrush (adults, Ball; McDunnough); **Chrysothamnus graveolens** Greene, Rabbit Brush (adults, Ball); **Hymenoclea salsola** T. & G. (Davis).

**Clastoptera canyonensia** Doer.

**Clastoptera delicata** Uhl. **Artemisia tridentata** Nutt, sagebrush (Ball, Beamer); **Chrysothamnus graveolens** Greene, Rabbit Brush (Ball, Beamer); **Salsola pestifer** A. Nels. Russian Thistle or cactus (Fox); rank growth of plants in damp grounds (Uhler).

**Clastoptera distincta** Doer.

**Clastoptera elongata** Doer. **Betula** sp. birch (adults, Beamer); **Juniperus**, cedar (adults, Beamer); **Populus angustifolia** James. Narrow-leaved Cottonwood (adults, Heinrich).

(To be concluded in the July issue)

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